



AIR QUALITY BUREAU
ATTN: Application Log in
7900 Hickman Rd., Suite 1
Windsor Heights, IA
50324

IOWA DNR Air Construction Permit Application

Form GHG Facility and Project Greenhouse Gas Emission Inventory

See instructions on reverse side

Company Name:

PSD Classification: ☐ Major ☐ Minor ☐ Unknown

*Check box in (1) below if source is part of project

STACK/VENT EMISSIONS SUMMARY

(1) *	(2) EP ID	(3) EU ID	(4) Source Description	(5) Construction Date	(6) Permit Number	(7) Potential or Permitted Emission Rate						
						CO ₂ (TPY)	CH ₄ (TPY)	N ₂ O (TPY)	SF ₆ (lb/yr)	HFCs (lb/yr)	PFCs (lb/yr)	CO ₂ e (TPY)
<input type="checkbox"/>												
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<input type="checkbox"/>												
<input type="checkbox"/>												
<input type="checkbox"/>												
<input type="checkbox"/>												
<input type="checkbox"/>												
(8) Total Stack Emissions												

FUGITIVE EMISSIONS SUMMARY

<input type="checkbox"/>	(9) Source:										
<input type="checkbox"/>											
<input type="checkbox"/>											
(10) Total Fugitive Emissions											
(11) Total Project Emissions											
(12) Total Plant Emissions											

Instructions for Form GHG

This form is designed to provide the review engineer information on plant-wide total emissions and emissions from each emission point of total Greenhouse Gas (GHG) emissions. Total emissions are used to classify the plant into the appropriate categories for PSD and Title V programs. This form is also designed to provide GHG emissions for the project. GHG emissions are required to be submitted for the project as of July 1, 2007 per Iowa Code 455B.131 as amended by Senate File 485.

Fill in your company name and check the appropriate PSD source classification box (if known).

Note:

- ✓ This form is required for every construction permit application even if the potential GHG emissions are zero. However, if you indicate that the plant is a major PSD source, you may list only the emission points that are new or were modified for 5 years before the proposed construction date requested in the application. Changes of emission rates at any emission point during the 5-year period should be demonstrated by an attachment labeled GHG-A.
- ✓ List **ALL** emission units in the project **including exempt units and other non-permitted emission units** (i.e. natural gas boilers rated less than 10 MMBTU/hr, chillers, small units, etc.). Mobile sources (i.e. trucks, forklifts, cars, etc.) are not required to be listed.
- ✓ For a minor or unknown PSD source, list all emission points at your plant.
- ✓ Emission units may be grouped into categories (i.e. chillers, space heaters, etc.).
- ✓ If the project is a modification to an emission unit, the facility shall report the total GHG emissions for the unit.
- ✓ If multiple emission units use a common emission point, fill in the emission point ID in column (2). List all emission units involved in columns (3) and (4) below that emission point (EP) ID.
- ✓ Calculations showing how the potential GHG emissions were calculated must be submitted along with this form unless they are already provided elsewhere in the application.
- ✓ More information concerning GHG emissions, including emission factors, can be found on the Air Quality Bureau's Greenhouse Gas page under the "Emissions Estimate Tools" heading. The page can be accessed by going to <http://www.iowadnr.gov/InsideDNR/RegulatoryAir> and clicking on the Greenhouse Gas Emissions heading on the left or by going directly to the Greenhouse Gas page at <http://www.iowadnr.gov/InsideDNR/RegulatoryAir/GreenhouseGasEmissions.aspx>.
- ✓ The emissions from exempt and grandfathered units **MUST** be included in this emission inventory.

Stack/Vent Emissions Summary:

1. Check the box in this column for each emission point or emission unit that is part of the current project. For sources that are located at the facility but not modified or altered as a part of the current project, do not check the box.
2. Provide the emission point (stack or vent) identification number. Include the emission point number of the source or sources for which you are seeking a permit.
3. Provide the emission unit(s) identification number(s).
4. Provide a brief description of the source identified in column (3).
5. The date of construction of the emission unit is the date (both month and year) in which construction or modification begins as defined in EU Form Instruction item 7.
6. Provide the permit number for the emission point, if any. If there is no permit number, indicate if there is an exemption being claimed for the emission unit by referencing the Iowa Administrative Code (e.g. 567 IAC 22.1(2)"...").
7. Fill in the rate of potential to emit or permitted emission rate in the appropriate units (either **tons per year or pounds per year**) for each pollutant. See Instructions in Item 4 of Form EC for definition of "Potential to emit". The following are the GHG emissions that must be included:
 - (a) **CO₂**: Carbon dioxide.
 - (b) **CH₄**: Methane.
 - (c) **N₂O**: Nitrous oxide. Also known as dinitrogen oxide or dinitrogen monoxide.
 - (d) **SF₆**: Sulfur hexafluoride

- (e) **HFC:** Hydrofluorocarbons
 (f) **PFC:** Perfluorocarbons
 (g) **CO₂e:** Carbon dioxide equivalent. CO₂e emissions are defined as the sum of the mass emissions of each individual GHG adjusted for each pollutant's global warming potential (GWP) as shown in Example 1 below. Guidance on calculating CO₂e is also available at <http://www.iowadnr.gov/InsideDNR/RegulatoryAir/GreenhouseGasEmissions/GHEstimationTools.aspx> under the heading "Emissions Estimate Tools". Since GWP values may vary for each individual GHG pollutant, applicants should use the GWP values in Table A of this form or if not listed, the values in Table A-1 of the Greenhouse Gas Reporting Program (GHGRP) (40 CFR Part 98, Subpart A, Table A-1).

Example 1:

Pollutant	Mass (TPY)	GWP	CO ₂ e (TPY)
CO ₂	10,000	1	10,000
CH ₄	100	21	2,100
N ₂ O	50	310	15,500
SF ₆	51 lb/yr	23,900	609
Total	10,150		28,209

Attach a copy of your calculations showing how the potential GHG emissions were calculated to this form. Total HFCs and PFCs are to be listed in Box 4, but the calculations shall separate out the individual HFCs and PFCs. Please note that individual HFCs and PFCs also have different GWP and care should be taken to calculate CO₂e when these pollutants are emitted. If you have more stack/vent emission sources than can fit on this form, attach a list (labeled GHG-A) to this form.

See Table A for a list of most common greenhouse gases and their chemical formula.

8. Fill in the sum of the emission rate for each pollutant for all emission points (stacks or vents). The emissions from exempt and grandfathered units **MUST** be included in this total.

Fugitive Emissions Summary:

9. Fugitive emissions are those emissions that cannot reasonably be made to pass through a stack or vent or equivalent opening. Examples include equipment leaks, portion of landfill gas emissions, portion of wastewater treatment plant emissions, etc. Fugitive emissions must be included on this form if they are part of the current project or if they are not part of the current project but the following criteria are met. Please note: fugitive emissions that are part of the project but do not meet the following criteria are not counted towards Title V or PSD applicability.

- (a) Your fugitive emission sources are quantifiable;
 (b) Your plant is one of the 28 named source categories found in PSD rules in 40 CFR 52.21;
 (c) Your emission unit is of the source category regulated by a NSPS (40 CFR Part 60) or NESHAP (either 40 CFR Part 61 or Part 63) standard that was promulgated as of August 7, 1980;
 (e) Your plant has been determined to be major for PSD.

If none of the above applies to your application, you do not have to include any fugitive emissions.

Assign an identification number to each fugitive source. This can be any number, as long as it is different from the emission point numbers and consistent with numbers submitted in other permit applications, including operating permit applications. If you have more fugitive emission sources than can fit on this form, attach a list (labeled GHG-A) to this form. Briefly describe each source. Fill in the rate of potential to emit in tons per year for each pollutant.

10. Fill in the sum of all fugitive emissions for each pollutant.
 11. Fill in the sum of the total project emissions for each pollutant, including emission points and fugitive sources. This includes only those emission point/emission unit that you have indicated are part of the project. If the total for any pollutant column is zero, please fill in zero.
 12. Fill in the sum of the total plant emissions for each pollutant, including emission points and fugitive sources.

TABLE A: COMMON GREENHOUSE GASES*

Common Name	Name	Formula	CAS Number	GWP**
	Carbon Dioxide	CO ₂	124-38-9	1
	Methane	CH ₄	74-82-8	21
	Nitrous Oxide	N ₂ O	10024-97-2	310
	Sulfur Hexafluoride	SF ₆	2551-62-4	23,900

HYDROFLUOROCARBONS:

HFC-23	trifluoromethane	CHF ₃	75-46-7	11,700
HFC-32	difluoroethane	CH ₂ F ₂	75-10-5	650
HFC-41	fluoromethane	CH ₃ F	593-53-3	150
HFC-43-10mee	1,1,1,2,2,3,4,5,5,5-decafluoropentane	CF ₃ CHFCHFCF ₂ CF ₃	138495-42-8	1,300
HFC-125	pentafluoroethane	C ₂ HF ₅	354-33-6	2,800
HFC-134	1,1,2,2-tetrafluoroethane	C ₂ H ₂ F ₄	359-35-3	1,000
HFC-134a	1,1,1,2-tetrafluoroethane	CH ₂ FCF ₃	811-97-2	1,300
HFC-143	1,1,2-trifluoroethane	C ₂ H ₃ F ₃	430-66-0	300
HFC-143a	1,1,1-trifluoroethane	C ₂ H ₃ F ₃	420-46-2	3,800
HFC-152	1,2-difluoroethane	C ₂ H ₄ F ₂	624-72-6	53
HFC-152a	1,1-difluoroethane	CH ₃ CHF ₂	75-37-6	140
HFC-161	fluoroethane	CH ₃ CH ₂ F	353-36-6	12
HFC-227ea	1,1,1,2,3,3,3-heptafluoropropane	CH ₃ HF ₇	431-89-0	2,900
HFC-236cb	1,1,1,2,2,3-hexafluoropropane	CH ₂ FCF ₂ CF ₃	677-56-5	1,340
HFC-236ea	1,1,1,2,3,3-hexafluoropropane	CHF ₂ CHFCF ₃	431-63-0	1,370
HFC-236fa	1,1,1,3,3,3-hexafluoropropane	C ₃ H ₂ F ₆	690-39-1	6,300
HFC-245ca	1,1,2,2,3-pentafluoropropane	C ₃ H ₃ F ₅	679-86-7	560
HFC-245fa	1,1,1,3,3-pentafluoropropane	CHF ₂ CH ₂ CF ₃	460-73-1	1,030
HFC-365mfc	1,1,1,3,3-pentafluorobutane	CH ₃ CF ₂ CH ₂ CF ₃	406-58-6	794

PERFLUOROCARBONS:

PFC-14	perfluoromethane	CF ₄	75-73-0	6,500
PFC-116	perfluoroethane	C ₂ F ₆	76-16-4	9,200
PFC-218	perfluoropropane	C ₃ F ₈	76-19-7	7,000
PFC-3-1-10	perfluorobutane	C ₄ F ₁₀	355-25-9	7,000
PFC-318	perfluorocyclobutane	C-C ₄ F ₈	115-25-3	8,700
PFC-4-1-12	perfluoropentane	C ₅ F ₁₂	678-26-2	7,500
PFC-5-1-14	perfluorohexane	C ₆ F ₁₄	355-42-0	7,400

* 567 IAC 20.2 defines a greenhouse gases as carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. This is not an all inclusive list of HFCs and PFCs. Please see <http://www.iowadnr.gov/air/prof/ghg/ghg.html> for a list of HFC and PFC Chemical Names, Trade Names, and Blends.

** Applicants should use the GWP values required by the federal Greenhouse Gas Reporting Program in 40 CFR 98, Subpart A, Table A-1. The GWPs are included on this form for convenience.